CLAIMS:

1. An interactive tracking system for tracking a position and orientation of a tool and for interaction with an operator of the tool in computer-assisted surgery, the interactive tracking system comprising:

a detectable device trackable for position and orientation and adapted to be mounted to a tool;

an interaction device adapted to be mounted to the tool and actuatable to send an interaction signal relating to a function of the tool;

a tracking system for tracking the detectable device for position and orientation; and

a computer-assisted surgery system connected to the tracking system for calculating a position and orientation of the tool as a function of the tracking of the detectable device and for initiating an interaction as a function of the position and orientation of the tool when receiving the interaction signal.

2. A passive optical interface apparatus for tracking by a tracking system of an object in space for position and orientation and for interacting with the tracking system, the passive optical interface apparatus comprising:

at least three passive detectable devices trackable for position by the tracking system; and

a mounting device for receiving the three passive detectable devices in a known geometry and adapted for being secured to the object such that a position and orientation of the object is calculable

by the tracking system as a function of a tracking of the known geometry of the passive detectable devices, at least a first of the passive detectable devices being displaceable with respect to the object, a displacement of said first of the passive detectable devices with respect to the object being detectable to initiate an interaction with the tracking system while maintaining the tracking of the object.

3. The passive optical interface apparatus according to claim 2, wherein the apparatus comprises four of said passive detectable devices trackable for position by the tracking system, a second, a third and a fourth of the four passive detectable devices being positioned in said known geometry and the first of the four passive detectable devices being displaceable with respect to the known geometry, a displacement of the first of the four passive detectable devices with respect to the known geometry being detectable to initiate an interaction with the tracking system.

4. The passive optical interface apparatus according to claim 3, wherein the first of the four passive detectable devices is displaceable between a first position to at least a second position with respect to the known geometry, a displacement of the first of the four passive detectable devices from the first position to the second position being interpreted by the tracking system as a first type of interaction, a displacement of the first of the four passive detectable devices from the second position

to the first position being interpreted by the tracking system as a second type of interaction.

5. The passive optical interface apparatus according to claim 3, wherein the first of the four passive detectable devices is biased to a first position by the mounting device, a displacement of the first of the four passive detectable devices away form the first position being detectable to initiate an interaction with the tracking system.

6. The interactive tracking system according to claim 1, wherein:

the detectable device is the known geometry according to any one of claims 2 to 5;

the interaction device is the first of the passive detectable devices according to any one of claims 2 to 5;

the tracking system is a passive optical tracking system tracking a position and orientation of the known geometry; and

the computer-assisted surgery system has an interaction signal interpreter for detecting a displacement of the first of the passive detectable devices with respect to the tool to initiate an interaction with the handler.

7. A method for interaction between a tracking system tracking a position and orientation of an object in space and a handler of the object, the object having at least one detectable device with at least two detectable configurations, comprising the steps of:

i) tracking a position and orientation of the detectable device for calculating a position and orientation of the object as a function of the position and orientation of any one of the detectable configurations of the detectable device;

ii) interpreting a change between the detectable configurations as an interaction signal from the handler; and

iii) responding to the interaction signal by initiating an interaction response to the handler.

8. The method according to claim 7, wherein the detectable configurations are a first and a second geometrical pattern of at least three passive detectable devices of the detectable device, each of the at least three passive detectable devices being trackable for position by the tracking system.

9. The method according to claim 8, wherein the change is a displacement of a first of the passive detectable devices away from a first position, the detectable device having four of the passive detectable devices, with the first geometrical pattern being a second, a third and a fourth of the passive detectable devices in a known geometry and the first of the passive detectable devices in the first position with respect to the known geometry, and with the second geometrical pattern being the second, the third and the fourth of the passive detectable devices in the known geometry and the first of the passive detectable devices being away from the first position with respect to the known geometry, the known geometry being fixed to the

object such that the position and orientation of the object is calculated as a function of the position and orientation of the known geometry.

10. The method according to claim 8, wherein the change is a displacement of a first of the passive detectable devices between a first and a second position, the detectable device having four of the passive detectable devices, with the first geometrical pattern being a second, a third and a fourth of the passive detectable devices in a known geometry and the first of the passive detectable devices in the first position with respect to the known geometry, and with the second geometrical pattern being the second, the third and the fourth of the passive detectable devices in the known geometry and the first of the passive detectable devices being in the second position with respect to the known geometry, the known geometry being fixed to the object such that the position and orientation of the object is calculated as a function of the position and orientation of the known geometry.

11. The method according to claim 7, wherein the change from a first to a second of the detectable configurations is interpreted in step ii) as a first type of the interaction signal, and the change from the second to the first of the detectable configurations is interpreted in step ii) as a second type of the interaction signal.

12. The method according to claim 11, wherein a first type of the interaction signal is initiated in

response to the first type of the interaction signal in step iii), and a second type of the interaction signal is initiated in response to the second type of the interaction signal in step iii).

13. The method according to any one of claims 7 to 12, wherein the interaction response is a function of the position and orientation of the object.

14. An interaction signal interpreter computer program product comprising code means recorded in a computer readable memory for executing the method defined in any one of claims 7 to 13.